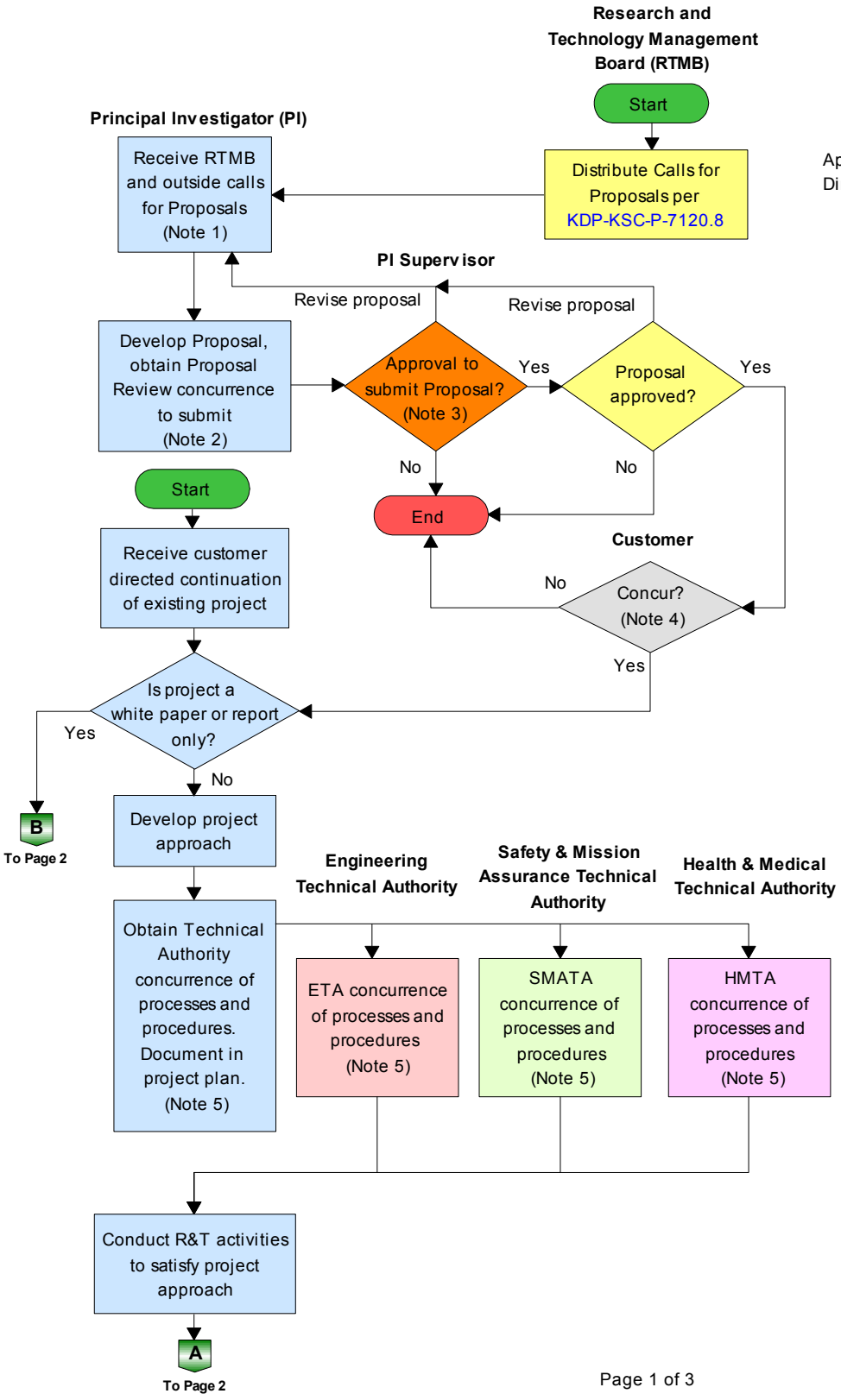
Conducting Research and Technology Development Projects

Objectives:

- to define the process for obtaining approval for and conducting Research and Technology Development projects (R&T) within UB that are compliant with NPR 1080.1 Requirements for Conduct of R&T and NPR 7120.8 NASA R&T Program and Project Management Requirements
- to provide a process for obtaining Technical Authority (TA) concurrence for the proposed program/project processes and procedures selection from the Engineering TA (ETA), Safety and Mission Assurance TA (SMATA), and the Health and Medical TA (HMTA) per NPR 7120.8, paragraph 5.4.



Approval _____
Director, Exploration Research and Technology Programs

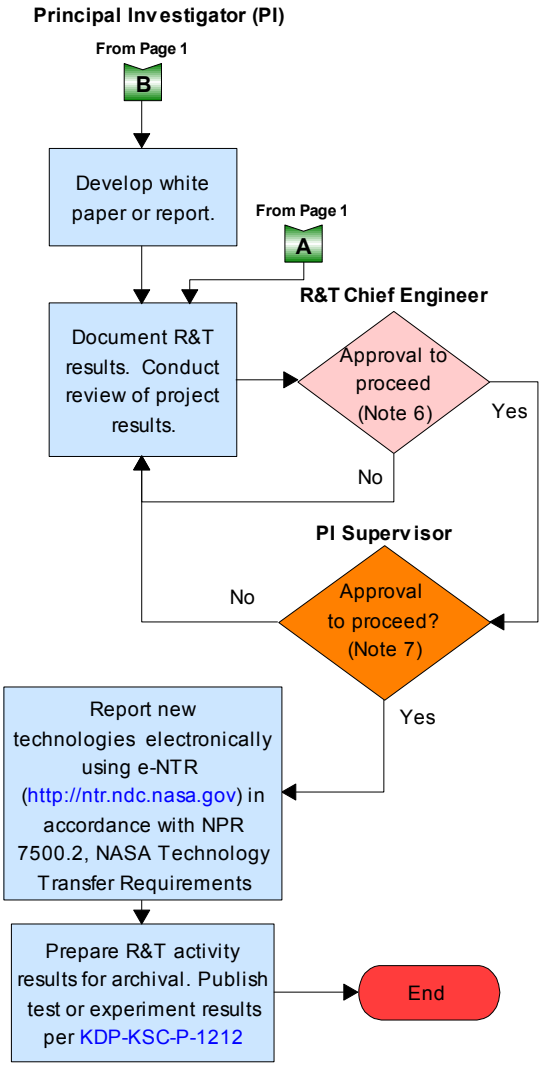
Note 1: Proposal calls include Center, Agency and other organizational calls for proposals or White Papers to be submitted for R&T programs/projects, journal articles or conference papers. Proposal reviews may include colleagues, customers, and other Subject Matter Experts (SMEs) requested by the PI.

Note 2: Proposal review will be conducted to satisfy the proposal call. Proposal reviews may include the involvement of the Engineering Technical Authority (ETA), Safety and Mission Assurance Technical Authority (SMATA) and the Health and Medical Technical Authority (HMTA) to understand the proposed implementation processes.

Note 3: Supervisory approval involves concurrence in the results of the PI proposal review, compliance with proposal call requirements, and alignment with the NASA Technology Roadmap.

Note 4: Obtain customer concurrence to proceed with the proposed project plan, processes, milestones and deliverables.

Note 5: See Note 5 on bottom of Page 2.



Note 6: Chief Engineer review of technical project products is based on NPR 7123.1B paragraph 2.1.6 and may be delegated to SME(s) or PI Supervisor.

Note 7: Supervisory approval involves concurrence in the review of project results, compliance with proposal requirements, and the adequacy of the test methods to support the conclusion. Supervisor may institute a peer review process per NPR 1080.1, paragraph 3.3 for journal articles or conference papers.

Note 5: The Project Plan shall include enough detail to establish the cost, schedule, and technical aspects of the project and the risks associated with each of these aspects. The Project Plan may be as simple as the quad chart presented to the RTMB to utilizing the NPR 7120.8 Appendix G. R&T Project Plan Template. Agreements to utilize lab space, employees and equipment not in the direct control of the PI including any training and consumables required shall be documented within the cost, schedule and technical sections of the Project Plan. Export Control and Intellectual Property concerns shall be identified and documented within the Project Plan. The table below may be utilized as a starting point for process selection for R&T projects. Deletions from this list or additional processes, specifications, rules, best practices, etc., necessary to fulfil programmatic mission performance requirements may be made with concurrence with the appropriate TA. PIs and TAs will utilize NPR 7120.8 para. 3.7.9 to resolve disagreements involving proposed programmatic or technical actions. PIs and TAs will utilize NPR 7120.8, Paragraph 3.6 and KSC-PLN-5400, Paragraph 7, Process for Handling Dissenting Opinions if required. Issues identified during the ETA reviews that impact SMATA and HMTA areas of responsibility will be immediately forwarded to those TAs then tracked to resolution at the R&T ETA reviews. Business records will be maintained per the requirements of the applicable processes.

R&T Areas	ETA	SMATA	HMTA
Flight Hardware	Controlling Program Requirements		
Flight Software	Controlling Program Requirements		
Ground Support Equipment	KDP-P-5031	KDP-KSC-P-5458	KDP-KSC-P-5458
Ground Support Software	KDP-P-3917	KDP-KSC-P-5458	KDP-KSC-P-5458
Critical Hardware	KDP-P-5031	KDP-KSC-P-5458	KDP-KSC-P-5458
Long Term Lab Equipment	KDP-P-2723	KDP-KSC-P-5458	KDP-KSC-P-5458
New or uncertified Pressure Systems	KDP-P-2723	KDP-KSC-P-3621	N/A
Drawing/analysis release	KDP-P-2718 for KDDMS KDP-KSC-P-1537 for EDC KDP-KSC-P-1058 for TechDoc	N/A	N/A
R&T Development other than above	N/A	KDP-KSC-P-5458	KDP-KSC-P-5458
Intellectual Property - KDP-P-1551 and NPD 2901.1C		Export Control - KDP-KSC-P-2190	

Applicability: This process applies to Exploration Research and Technology Programs Directorate projects other than Flight and Ground Systems being developed for Space Flight projects. The intent is to provide a structured process for Research and Technology Development projects to ensure a successful outcome.

Research and Technology (R&T) Development Projects:
R&T Projects may be divided into two parts: The Unknown (hypothesis), which is allowed to fail, and the Known (Test Apparatus), which are discouraged to fail. A failed hypothesis can be a successful R&T project. Failure of test apparatus (test design) should be avoided. The test apparatus in an R&T Project should work as intended because it is not new technology. The new technology is contained in the goal/hypothesis to be proven. A basic research project may or may not have a test apparatus.

Standards:
R&T projects shall comply with all applicable NPR, KNPR, OSHA, and other requirements that are levied on the project from NASA, KSC, and State and Local Governments. Performance requirements and specifications applying to the project shall be agreed to before ETA approval to proceed. Project performance requirements or specifications which will not be met shall be documented with justification. The PIs and TAs may agree to apply additional process, specifications, rules, and best practices if necessary to fulfill programmatic mission performance requirements.

Project Documentation:
R&T Projects and Proposals going to the RTMB will be reviewed by the ETA to determine the review process required. ETA will work with the PM and/or PI to establish and quantify the review/documentation requirements in addition to any specific program imposed requirements/documentation. Examples of required documentation include SMA and HM TAs processes documented in accordance with KDP-KSC-P-5458 or prototype and test fixture engineering documentation in accordance with KDP-P-2713. (See Skunk Works Rule #4). There must be a minimum number of required documents, but important work must be recorded thoroughly. (See Skunk Works Rule #5). The specifications applying to the design, building and testing of the hardware/software must be agreed to well in advance of implementation. The Skunk Works practice of having a specification section stating clearly which important Government or industry specification items will not knowingly be complied with and reasons therefore is highly recommended. (See Skunk Works Rule #10).

Ground Support Equipment is defined in KSC-DE-512-SM.

Critical Hardware is hardware whose failure could cause damage to significant ground assets or serious injury to personnel.

Laboratory Test Equipment:
The design of Laboratory Test Equipment that will be used by multiple technology development projects will utilize KDP-P-2713.